Advocacy Participants within the Content Advocacy Group identified interest areas on index cards. Based on the input received, the following four subgroups were formed:

- Content Development Guidelines
- Tools
- Evaluation of Effectiveness
- Methods and Techniques

The next sections summarize the recommendations generated by each subgroup.

Subgroup: Content Development Guidelines

Purpose: To focus upon the types of guidelines that should be established for developing ADL content so that learning can be maximized and so that the instructional content can be reused.

Clarification of Purpose: At a rather high level of conceptualizing about instruction, one can decompose instruction into two classes of information, "What to teach and How to teach it." The What to teach is concerned with the content of instruction, whereas the How to teach is concerned with instructional activities or strategies of instruction which overlay the content in order to promote learning. Both classes of information must insure the integration of valid instructional technology in order to maximize learning. The ADL Content Development Guidelines Group focus is upon the What to teach class of information. In keeping with this focus a number of issues were raised regarding what should be included in the creation of instructional content for ADL application.

Issue #1: Definition of an Instructional Object

A major issue of concern was the definition of an “object” which contained instructional content. The group resolved to define an object as a unit of instruction that could incorporate different levels of detail. At the lowest level an object could consist of a simple fact, which could not further be decomposed and yet have meaning. At the highest level an object could consist of the exposition of how some physical or scientific system works, some mathematical expression or how a task could be performed. Objects higher than simple facts could be further decomposed into smaller units of instruction, each smaller unit consisting of a lower level of analysis of the system, task, or expression described in a higher unit of instruction. Instructional content could then be organized in a hierarchy or as a set of units linked to other units in a network. The level of detail into which instruction could be decomposed was left up to the developer. However, if the content were not decomposed to its lowest level of detail, other developers would have the facilities to further decompose the instructional content of the original developer.

This method of decomposing and organizing instructional content would allow other developers to make use of objects from different domains in developing new topics of instruction, to maximize the development of instructional content for ADL application. Decomposition of curriculum content is also a fundamental practice in the development of any instructional system to facilitate learning and typically involves the use of a task analysis process either a cognitive task analysis or a behavioral-rational task analysis. Recent advances in cognitive science have indicated that the level of decomposition of content can have a significant impact upon the efficiency with which a subject matter can be learned. Consequently, care must be taken in specifying the level of detail with which a subject matter must be decomposed into its constituent objects.

Issue #1: Definition of an Instructional Object

In addition to maximizing development of instructional content one must also insure that a unit is structured to maximize the ease of which a student or trainee can learn the instructional content.

ADL Action Item: There should be a minimal set of guidelines for structuring information in an instructional unit such that other strategies of instruction can be imposed upon the unit without having to customize a strategy for each content area and that the instructional unit is decomposed to a level of detail appropriate for the audience for which it is intended.

Issue #2: Metadata

Consequently, a unit of instructional content must allow a developer ready access to its contents to determine if an object is appropriate for incorporation into a developers curriculum. This access can be facilitated by what is referred to as metadata. The metadata of an instructional unit should at a minimum classify the content as belonging to specific domains, have a description of the media employed to present the content, an indication as to whether the content has specific equipment requirements for execution, whether or not the source code for the content is available, some indication as to the level of detail of the information making up the content such that developers can determine its suitability for use and the level of effort which might be required to modify the content for the developers purposes and some specification as to what is required to integrate lesson content with other objects (i.e. the issue of interoperability of objects).

ADL Action Item: The group agreed that considerable attention must be given to the specification of metadata in order to facilitate the construction of curriculum by developers. The metadata must allow a developer to rather quickly decide if an instructional object is suitable for his or her purposes without having to spend an inordinate amount of time examining the entire object of potential concern.

Issue # 3: Interoperability

The issue of interoperability becomes clearly important if one wishes to link various objects to create a simulation of a system. However, interoperability of an object is also important with respect to the types of instructional strategy components that can readily use the object. As mentioned in the above, one would wish to facilitate the incorporation of an instructional strategy with various content objects without having to customize the strategy for the specific curriculum. There are ways of implementing instructional strategies at a generic level to avoid this costly process of customization of the strategy. However, this requires that an instructional object have specific fields that would contain information that the strategy could employ if it were to be applied using an instructional object. This issue seemed not to have been understood by the group and will require more elaboration preferably with members of the instructional strategy breakout group such that its implications and implementation can be better understood by the ADL content guidelines group.

ADL Action Item: It is therefore recommended that an additional group be created to work out these details.

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Purpose: To identify the tools required to support the ADL initiative.

The subgroup discussed the need for the ADL initiative to support the development of several types of tools and resources. Listed below are the subgroup's recommendations:

Item #1: Tools for Categorizing and Tagging Objects

The subgroup members recommended that tools be developed to help developers categorize and add metadata tags to objects. There was concern among subgroup members that the effort to tag objects should not outweigh the benefits of placing objects with a shared database. Therefore, the use of a tool to intelligently categorize and tag objects was seen as a critical priority for ADL.

The subgroup members indicated that this type of tools should:

- Be applied to both new objects and existing media that are being converted into objects (e.g., archives of still photos, motion video, sound, lessons plans, etc.).
- Include performance support system so that a novice user could use the tool with minimal instruction.
- Allow developers, instructors, and students to enter objects and search for existing objects.
- Provide a unique tag indicating if objects were reviewed for quality and to indicate who conducted the quality review. (The subgroup members felt it was critical that some system be available to designate if objects have met some quality standards or if the author was allowed to enter the object without any review of content or instructional quality. In addition, guidelines should be developed for ensuring the quality of objects.)
- Use a standard dictionary of terms and allow for a thesaurus to be built automatically. (The subgroup members stressed the need for consistent labeling of items. For example people may call the same object by different names autos, automobiles, cars, vehicles, etc.)

ADL Action Item: It is recommended that a study of the different systems/tools currently in use to categorize and tag objects be completed. This study should compare the advantages and disadvantages of the different systems/tools. It should also determine what new development may be needed to support the ADL initiative.

Item #2: Authoring/Development Tools

The next type of tools discussed by the subgroup was authoring tools. The subgroup members felt that it would be beneficial to develop a matrix listing all current authoring tools. The matrix would include the following types of information:

- Platform requirements for development and delivery.
- Features (and if those features were advertised or tested features).
- Ease of converting outputs (code, lessons, etc.) to objects compliant with IMS.
- Level of instructional design support embedded in the system.

ADL Action Item: It is recommended that an Authoring/Development Tools matrix be developed and posted on the ADL Web Site. The matrix should be maintained at least monthly. In addition, a chat/discussion forum should be established on the ADL Web Site for exchange of information on emerging authoring/development tools.

Item #3: Registration Tools

The subgroup members felt that a single registration system should be developed. This registration system should allow students to move their registration information from one organization to the next.

ADL Action Item: It is recommended that a model registration system be established and distributed to ADL participants.

Item #4: Expert Systems

The subgroup members indicated that expert systems be created to assist developers to select design/authoring tools. Another expert system should developed for use by students and developers to locate needed learning objects.

ADL Action Item: It is recommended that a research-and-development effort be initiated to develop expert systems to support ADL.

Item #5: Demonstrations of Technology-Based Instructions

The subgroup members suggested that a series of technology-based demonstrations be available through the ADL Web Site. The demonstrations should show different levels of training and the resources (e.g., dollars and time) required to produce each demonstration. In addition, a performance support system should be available to help planners develop business cases for supporting the use of technology-based training methods.

ADL Action Item: It is recommended that demonstrations of technology-based instruction be included on the ADL Web Site. A description should be included with each demonstration stating the level of interactivity, media used, and business case. In addition, an automated worksheet should be developed to help users develop their own business cases for developing technology-based training.

Item #6: Content Focus Areas for Research and Support

The subgroup members discussed ADL priorities for supporting development of key content areas. The subgroup members indicated that the top priorities for ADL research-and-development support are as follows:

- Basic skills (e.g., reading, writing, math)
- Basic technical skills (e.g., computer and internet skills)
- Network/internet-based simulation tools

ADL Action Item: It is recommended that ADL facilitate partnerships among groups with common content development interests. The ADL Web Site should create a database with content area interests by points of contacts. Users should be able to search the database. In addition, the ADL should seek resources to help support development in these areas.

Subgroup Facilitator: Sharon Fisher
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Purposes: (1) To list the types of learning methods and techniques to be supported by the ADL system. (2) To identify which of these methods/techniques are candidates for research projects. (3) To suggest how the ADL initiative can promote the use of more advanced learning methods.

Result #1: Define Learner Outcomes: The subgroup members defined the realm of learner outcomes and defined learning environments in ADL that might be used to realize those outcomes (see below).

ADL Action Items

- Coordinate with metadata specification group to ensure searches by pedagogical approach (e.g., by learner outcomes, learning environments).
- Solicit models for developing these learning environments over the ADL web site. Success stories, lessons learned. Focus is not just technology solutions but overall project management issues, team composition.

Result #2: List Implementation Barriers: The subgroup members listed implementation barriers to using advanced learning methods. The subgroup members felt that barriers to implementation did not reside so much in the technology solutions but in implementation challenges (listed on the following page).

ADL Action Item: No-Action Item defined yet - any suggestions welcome.

Result #3: Identify Methods: The subgroup members raised the issue of methods for converting classroom material to ADL environments. The subgroup members did not have time to address this issue in the break-out session.

ADL Action Item: Solicit models for conversion. Success stories, lessons learned.

Call for volunteers & members: General session started before a list of participating members in the working group was collected. To be included on a list-serve please send your name to chair. One or two volunteers for co-chairs for the working group are solicited to share responsibilities and ensure an active group. Volunteers to take on any of the stated action items or defined a new one are welcome.

Content Methods Working Group Chair: Michelle Sams
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Following are notes from this subgroup.

Learner Outcomes
How to learn
Self-assessment
Transfer skills
Basic knowledge (recognition & recollection of facts, fundamental concepts, product knowledge)
Basic skills (reading, writing, computational skills)
Procedural Skills
Motor Skills
Observational Skills
Organizational Skills
Critical Thinking
Decision Making (from simple to complex, including tactical decision making)
Situational Awareness
Pattern Recognition
Troubleshooting
Problem Solving
Metacognition
Abstract thinking
Building Models
Social Skills (interpersonal communication, negotiation, leadership skills)
Group Dynamics (team building, group problem solving, conflict resolution)
Attitudes, Enjoyment

Learning Environment Continuums

Note that the following are not exclusive categories and features, but served as an organizer.

Collaborative (asynchronous, synchronous, text, graphics, audio, video, shared objects, shared applications, MUDs, MOOs)

Adaptive (filtering, student profiling, learning styles, proficiency gates, remediation, student modeling, dynamic adaptation of material, intelligent tutoring, coaching, mentoring)

Experiential (observe demonstrations, student interacts with simulation, student interaction changes simulation outcome, student constructs the simulation)

Exploratory (guided exploration, independent navigation within defined environment, independent exploration without environment constraints)

Misc. (Drill and Practice, Critical Incident, Lessons Learned, Expert Witness)
Feedback can exist in any of the above environments (right/wrong/try again; simple explanations; expository text, graphics, simulation; scaffolded feedback for novice to expert progression; tutorial dialog with deep reasoning)

Implementation Challenges

Availability
Access
Cost & resource constraints
Standards
Usability
Transferability
Bandwidth